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genera and species of Fossil Fishes from the Carboniferous Strata of Ohio." Referred to Drs. Le Conte, Leidy, and Hallowell.

Mr. Samuel Ashmead, in presenting the very fine collection of Marine Algæ made by himself during the past winter at Key West, Florida, stated that he was indebted to Prof. Bailey, of West Point, for his assistance in determining a number of the species.

April 29th.

Vice President BRIDGES in the Chair.

The Committees on Mr. Lea's papers, read 1st inst.; on Dr. Leidy's paper, read 8th inst.; on Mr. Kennicott's paper, read 15th inst; on a paper by Messrs. Meek and Hayden, read same date; on Dr. Leidy's papers, of same date; on Mr. Lea's paper, of same date; and on Dr. Newberry's paper, read 22d inst.; severally reported in favor of publication in the Proceedings.

Description of a New Sub-Genus of NAIADES.

By ISAAC LEA.

Family NAIADES.

Sub-genus PLAGIODON.

Testa æquivalvis, inæquilatera, obliquè trigona, valdè inflata; dentibus cardinalibus crenulatis, compressis, transversis, curtis, in utraqvè valva duplicis; dentibus lateralibus nullius; ligamentum vix extrorsum; impressio muscularis antica composita.

This sub-genus is proposed for a fluviatile shell, which is nearer to *Monocondylæa*, D'Orbigny, than to *Margaritana*, Schumacher; and may be considered properly so interposed as a link to connect them.

PLAGIODON ISOCARDIODES.

Testâ lævi, rotundo-trigona, globosâ, ventricosissimâ, ad lateris planulatis, valdè iniquilaterali, anticè brevissimâ, umbonibus tumidis, valvulis subtenuibus; natibus valdè elevatis, incurvis, terminalis; epidermide subrugosâ, tenebroso-olivaceâ; dentibus cardinalibus crenulatis, compressis, transversis, curtis, in utraqvè valvâ duplicis; margaritâ albâ et iridescente.

Hab. Rio Plata. Mr. E. Verreau, Paris.

Description of a New Species of TRIQUETRA, Klein (HYRIA, Lamarck.)

By ISAAC LEA.

TRIQUETRA LANCEOLATA.

Testâ lævi, transversissimâ, subcompressâ, lanceolatâ, valdè inequilaterali, posticè acuto-angulatâ: anticè caudatim producta; valvulis crassis; natibus parvis, prominulis, ad quartam anteriorem partem positis; epidermide striatâ, tenebroso-fuscâ; dentibus cardinalibus subgrandibus crenulatisque; lateralibus prælongis rectisque; margaritâ albâ et argenteâ.

Hab. China? Mr. Asa Fitch.

Description of New Fresh water Shells from California.

By ISAAC LEA.

Family LYMNÆANA.

Genus POMPHOLYX.

Testa rotundo-gibbosa, subtus retrorsa, superne planulata, non umbilicata; spira depressa, apertura amplissima, subrotunda, effusa; labro acuto; labio incrassato, planulato; operculum nullum.

POMPHOLYX EFFUSA. Testâ parvâ, striatâ, rotundo-gibbosâ, subtenui, effusâ, luteo-corneâ; anfractibus trinis, supernè planulatis, infernè convexis; aperturâ subrotundâ, dilatâtâ, intus albidâ, maculatâ.

Hab. Sacramento River, California. Dr. Trask.

MELANIA SHASTAENSIS. Testâ striatâ, subcylindraceâ, subtenui, tenebroso-corneâ, fasciatâ; spirâ elevatâ ad apice plicatâ; suturis valdè impressis; anfractibus convexis; aperturâ parvâ, ovatâ, intus albidâ; columellâ lævi, incurvatâ et recurvatâ.

Hab. Shasta and Scott Rivers, California. Dr. Trask.

MELANIA NIGRINA. Testâ lævi, parvâ, conicâ, subtenui, nigricanti, politâ; spirâ subelevatâ; suturis impressis; anfractibus regulariter convexis; aperturâ parvâ, ovatâ, supernè angulatâ, intus tenebroso-purpureâ; columellâ incurva, purpureâ.

Hab. Clear Creek, Shasta County, California. Dr. Trask.

PHYSA TRITICEA. Testâ subfusiformi, pellucidâ, politâ, rufo-castaneâ; spirâ brevi, subacutâ; suturis subimpressis; anfractibus quaternis, subconstrictis; aperturâ elongatâ, intus lineatâ.

Hab. Shasta County, California. Dr. Trask.

PLANORBIS TRASKII. Testâ magnâ, tenebroso-corneâ, subcylindraceâ, minutè, crebrè et regulariter striatâ, supernè latè et profunditer umbilicatâ; infernè magis excavatâ; anfractibus quinis, supernè acutè carinatâ ad peripheriam, infernè obtusè carinatâ; aperturâ auriculæformi.

Hab. Kern Lake, Tulan County, California. Dr. Trask.

LYMNÆA PROXIMA. Testâ acuto-conicâ, subtenui, crebrè et irregulariter striatâ, corneâ, minutè perforatâ; spirâ subelevatâ, ad apicem acuminatâ; suturis valdè impressis; anfractibus septenis, convexis; aperturâ subinflatâ, subellipticâ, intus fasciatâ, columellâ paulo plicatâ.

Hab. Arroya San Antonio, California. Dr. Trask.

ANCYLUS PATELLOIDES. Testâ magnâ, crassâ, ellipticâ, maculatâ, obliquè conicâ; striis crebris, minutis; apice submediali.

Hab. Sacramento River, California. Dr. Trask.

The following species, heretofore described, were part of the "envoi" made by Dr. Trask.

Margaritana margaritifera, Lea.

Alas. falcata, Gould.

Alas. Yubensis, Trask.

From Klamath and Yuba Rivers.

I received specimens of this shell from Prof. Nuttall in 1837, brought by him from Columbia River. I thought then, and I still think, there were not characters sufficiently distinct in them to form a new species. The observations published at the time (*Tran. Am. Phil. Soc.* v. 6, p. 97) are still in accordance with my opinions, after having had many specimens from various localities under examination. The purple in the nacre is stronger than any I have seen from other localities, but this with the other differences would not I think warrant its being considered more than a mere variety of *M. margaritifera*.

Anodonta Wahlamatensis, Lea. Tr. Am. P. S. v. 6, p. 78. = *A. triangulata*, Trask.
A. rotundovata, Trask. From Sacramento River.

Anodonta angulata, Lea. Tr. Am. P. S. v. 6, p. 97. = *A. feminalis*, Gould. *A. Randallii*, Trask. From upper San Joaquin.

Helix Oregonensis, Lea. Trans. Am. P. S. v. 6, p. 100. Point Cypress, Monterey County.

Helix Nickliniana, Lea. Trans. Am. P. S. v. 6, p. 100. Tomales Bay and Deadman's Island.

Helix Californiensis, Lea. Trans. Am. P. S. v. 6, p. 99. Point Cypress, Monterey County.

Lymnæa exigua, Lea. Trans. Am. P. S. v. 9, obs. v. 3. San Antonio Arroya.

Lymnæa pallida, Adams. Journal Boston Nat. Hist. Soc. v. 3. San Antonio Arroya.

Physa heterostropha, Say. Nicholson's Ency. Am. Edition. Los Angeles.

Melania occata, Hinds. Voy. of the Sulphur, pl. 15, f. 5. Sacramento River.

Melania seminalis, (*Paludina*, Hinds.) Voy. Sulphur, pl. 16, fig. 22. Sacramento River.

Planorbis trivolis, Say. Nicholson's Ency. Am. Ed. Hern Lake. Slightly varies from the Michigan specimens.

Planorbis ammon, Gould. Proc. Boston Soc. Nat. Hist. v. 5, p. 129. Lagoons, Sacramento Valley.

Descriptions of twenty-eight new species of Acepala and one Gasteropod, from the Cretaceous formations of Nebraska Territory.

By F. B. MEEK and F. V. HAYDEN, M. D.

PHOLADOMYA UNDATA. Shell oval or ovate, moderately ventricose, anterior end rounded, posterior extremity rounded chiefly from below, cardinal border nearly straight; base somewhat broadly curved; beaks rather elevated, incurved, placed between the centre and the anterior end; surface (of cast) ornamented by numerous, regular, distinct, concentric undulations, which are crossed by much smaller radiating costæ, scarcely marked in the depressions between. Length about one inch.

As we have not seen the hinge of this species, we refer it with doubt to the above genus. The radiating costæ are about equal, the spaces between, and in consequence of being marked only on the concentric undulations, and not in the intermediate depressions, furnish a character by which even fragments of the species may be at once identified.

Locality and position. Mouth of Judith River, in a sandstone supposed to be same as No. 1 of the series.

GONIOMYA AMERICANA. Our specimens of this interesting shell are too imperfect to give a clear idea of its form, though the direction of the lines of growth indicate an oblong or very narrow oval outline, with a narrowly rounded anterior and subtruncate posterior. Laterally the valves must have been considerably compressed. The beaks are small, not much elevated, and placed in advance of the centre. On the two extremities the costæ, which are quite distinct, traverse the shell obliquely backwards from near the hinge to the base, while those originating immediately in front and behind the beaks, converge and meet at various distances down the sides of the shell, so as to form arched or convex angles of from 20° to 30°. Surface ornamented by fine irregular lines of growth, crossed by regular, equi-distant, radiating rows of minute transparent granules, placed at regular distances from each other. These granules are so small as to be scarcely visible without the aid of a strong magnifier, under which they look like minute drops of melted amber.

In its surface markings this species resembles *G. Dubois* of Prof. Agassiz, (*Etudes critiques sur les Mollusques fossiles*, tab. 1.) but in our species the converging costæ continue to meet at the same acute angles as far as they can be traced towards the points of the beaks, while on the beaks of *G. Dubois* and

other allied species, these angles are truncated, and the opposite costæ united by horizontal bars. Perfect specimens would probably show other differences. This is, we believe, the first species of this genus found in America. According to Prof. Bronn, (*Index Palæontologicus*,) five species have been hitherto described from the whole cretaceous system, two of which were from the Neocomien, two from the green sand, and one from the true chalk.

Locality and position. Moreau Trading Post, No. 5 of the series.

SOLENSUBPLICATUS. Shell very thin and fragile, elongated, cardinal and basal margins straight and parallel; buccal extremity obliquely truncate, anal end rounded from below, both ends gaping; beaks nearly at the anterior extremity, not distinct from nor rising above the hinge line. Six to eight broadly rounded, very faint plications radiate from behind the beaks obliquely backwards to the posterior margin, to which they appear to have imparted a slightly waved outline; surface marked with faint lines of growth, and minute transverse closely arranged striæ, which do not radiate from the beaks, but traverse the shell at right angles to its longitudinal diameter. Length 1·15 inches; breadth ·26 inch; height ·42 inch.

The fine transverse striæ on this shell are only visible under a high magnifying power, and appear to have been as well marked on the inside as on the exterior, distinct impressions of them being left on internal cast.

Locality and position. Moreau river, No. 5 of the series.

TELLINA GRACILIS. Shell elliptical, moderately compressed, extremely thin and fragile; buccal margin rounded; posterior end contracted, subtruncate, and having a broad obsolete ridge passing from the beaks obliquely backwards to the postero-basal margin; cardinal border convex before and concave behind the beaks; lower border forming a regular elliptical curve; beaks rather depressed, and located a little behind the centre; surface marked with fine lines of growth. Length ·90 inch; breadth of left valve ·17 inch; height ·60 inch.

The above description is made out from a single left valve, so attached to the matrix as to show only external characters.

Locality and position. Mouth of the Judith, in a sandstone supposed to be the same as No. 1 of the series.

TELLINA EQUITRATERALIS. Shell elliptical, compressed, moderately thick, extremities rounded; anterior end slightly broader than the posterior; beaks small, not elevated, located a little in advance of the middle; surface marked with fine regular concentric lines. Length of right valve 1·15 inches; breadth ·12 inch; height ·57 inch.

We have of this species but one right valve, showing none of its internal characters. The position of its beaks, as well as its much greater thickness, preclude the idea of its being an opposite valve of the last.

Locality and position. Same as preceding.

TELLINA ? CHEYENENSIS. Shell ovate, compressed, very thin; anterior extremity rounded; posterior end subtruncate or rounded from above, and very obtusely angular below; base forming an elliptic curve; beaks somewhat elevated, placed a little in advance of the middle, surface ornamented with fine lines of growth and numerous small regular concentric wrinkles, becoming mere lines near the beaks and on the extremities. Length ·88 inch; breadth ·36 inch; height ·67 inch.

We have only seen the outside of this specimen.

Locality and position. Forks of Cheyenne River, No. 4 of the series.

TELLINA SCITULA. Shell elliptical, small, thin, much compressed, curved so as to be convex on the left, and slightly concave on the right sides; extremities narrowly rounded, the anterior end being wider than the posterior; beaks small, nearly central; base forming a regular elliptic curve; surface polished, and marked with distinct lines of growth. Length ·50 inch; breadth ·13 inch; height ·30 inch.

Locality and position. Moreau River, No. 5 of series.

TELLINA SUBELLIPTICA. Shell small, ovate or elliptical, thin, much compressed; anterior extremity rounded; posterior end somewhat rounded or subtruncate; beaks small, not much elevated, a little in advance of the centre; surface rather faintly marked with fine lines of growth. Length .50 inch; breadth .12 inch; height .32 inch.

This species is chiefly distinguished from the last by its more broadly rounded extremities, less distinct lines of growth, and greater thickness.

Locality and position. Cherry Creek, Upper part of No. 5 of the series.

TELLINA PROUTI. Shell ovate, much compressed, very thin and fragile; extremities rounded; posterior end somewhat contracted, and having a broad, indistinct ridge passing from the beaks obliquely backwards to the postero-inferior margin, the outline of which it may have slightly modified; cardinal border convex before, and concave behind the beaks; umbones nearly central, elevated, somewhat gibbous, closely approximate; surface ornamented with fine but distinct lines of growth; internal laminae of the shell marked with faint, very fine radiating lines; sinus of the pallial impression oblong, obtuse or subtruncate at the extremity, about one-third the length of the shell. Length 2.42 inches; breadth .83 inch; height 1.60 inches.

We have not seen the hinge of this shell. The species is dedicated to Dr. H. A. Prout, of St. Louis, Missouri, to whom we are indebted for the only specimen we have seen.

Locality and position. Fort Benton, No. 4 of the series.

CYTHAREA DEWEYI. Shell subcircular or slightly oval, somewhat compressed; beaks moderately elevated, a little in advance of the centre; surface ornamented by distinct irregular lines of growth; lunule small, narrow, oval or broad lanceolate, not very distinctly impressed; muscular impressions shallow, anterior one narrow ovate; posterior broad ovate, acutely angular above; pallial impression having a rather deep triangular sinus, forming at the apex an angle of 55°; border smooth. Length .96 inch; breadth .51 inch; height .85 inch.

Specimens slightly more elongated, but apparently identical with this, occur on the Yellow-stone River in a bed we have considered the upper part of No. 4, but which may represent No. 5. This species is dedicated to Prof. Chester Dewey, of Rochester University, N. Y.

Locality and position. Moreau River, No. 5 of the series.

CYTHAREA NEBRASCENSIS. Shell subcircular, much compressed; beaks somewhat elevated, small, a little in advance of the centre; ligamentary cavity long and very narrow lanceolate; surface marked with rather faint lines of growth. Length .70 inch; breadth .28 inch; height .60 inch.

The much more compressed form of this shell will serve to distinguish it at once from the last.

Locality and position. Same as preceding.

CORBULA VENTRICOSA. Shell small, very thin, subglobose, nearly equivalve; anterior end broadly rounded; posterior extremity abruptly contracted into a narrow prolongation; beaks elevated, ventricose, a little behind the centre of the globose part of the shell; surface marked with distinct irregular lines of growth; cardinal tooth of right valve prominent, flattened; posterior muscular impression deep; pallial impression having a broad triangular sinus. Length .55 inch; breadth .26 inch; height .27 inch.

Locality and position. Same as last.

CORBULA MOREAUSIS. Shell small, subovate, ventricose, rounded in front, suddenly contracted and somewhat attenuate behind; beaks prominent, situated behind the middle of the broadest part of the shell, rather inclined backwards; surface ornamented with strong, regular, elevated concentric lines, nearly equalising the spaces between. Length about .27 inch; breadth .10 inch; height .16 inch.

We have not yet seen the left valve of this shell, nor the interior of the right,

from which the above description is made out. The species may be distinguished from the last by its much stronger and more regular concentric lines.

Locality and position. Same as last.

CORBULA? GREGARIA. Shell very small, somewhat triangular, subglobose; right valve more ventricose than the left; beaks nearly central, gibbous, that of the right valve elevated considerably above the left, incurved; surface polished and marked with a few faint, irregular, concentric wrinkles, indicating stages of growth; hinge having under the beaks a single prominent tooth in each valve; anterior muscular attachment indistinct, posterior raised upon a strongly projecting lamina; pallear impressions scarcely sinuous. Length .13 inch; breadth .10 inch; height .13 inch.

It is with much doubt we refer this little shell to the genus *Corbula*. In the inequality of its valves, as well as in the character of its hinge, it agrees exactly with that genus, but we have seen no species of *Corbula* having either of the muscular attachments raised upon a projecting plate, as in this shell. In this respect it is more like *Cordilla* of Deshayes, but it appears to want the spoon shaped projection of the hinge of that genus; and it is the posterior, instead of the anterior muscular attachment that here forms a projecting plate. We suspect it belongs to an undescribed genus.

Locality and position. Yellow-stone River, one hundred and fifty miles from mouth, where it is found in vast numbers compacted together in concretions, in the upper part of No. 4 of the series.

ASTARTE GREGARIA. Shell small, subtriangular, rounded below and at the extremities, nearly equilateral, valves moderately convex; beaks much elevated, rather pointed, incurved, approximate, slightly turned forward; escutcheon narrow lanceolate; lunule somewhat broadly lanceolate or narrow ovate, not very distinctly impressed; surface ornamented by small, but distinct concentric undulations, and much finer lines of growth; border smooth; muscular impressions shallow. Length .21 inch; breadth .14 inch; height .21 inch.

Locality and position. Yellow stone River, from a bed probably near the top of No. 4, if not in No. 5 of the series. Abundant.

NUCULA SCITULA. Shell ovate, rather ventricose, rounded in front, somewhat contracted and narrowly rounded behind; umbonal region gibbous; beaks prominent, incurved, approximate, located in advance of the middle; surface marked with distinctly elevated, regular concentric lines, about equal to the spaces between, and stronger on the middle than towards the extremities of the valves; dorsal border marked by a distinct longitudinal groove behind the beaks. Length .39 inch; breadth .21 inch; height .22 inch.

From *N. ventricosa* of Hall and Meek, (see vol. 5, new series, Trans. Am. Acad. Arts and Sciences,) to which it bears some resemblance, this may be distinguished by its beaks being located nearer the anterior end, and by its larger size and comparatively smaller concentric lines.

Locality and position. Moreau River, No. 5 of the series.

NUCULA EVANSI. Shell elongate, narrow elliptical, thin, moderately convex; cardinal margin nearly straight, marked with a distinct longitudinal groove on each valve; extremities rounded, posterior end compressed and slightly gaping; inferior border forming an elliptical curve, with sometimes a faint impression near the middle; beaks very small, not much elevated, located in advance of the centre; surface polished and marked with faint lines of growth; muscular impressions indistinct; teeth of the hinge numerous, closely interlocked. Length .72 inch; breadth .22 inch; height .32 inch.

Dedicated to Dr. John Evans, U. S. Geologist of Oregon Territory.

Locality and position. Moreau River, No. 5 of the series.

NUCULA EQUILATERALIS. Our specimens of this shell are only casts. The species may be characterized as follows: subelliptical, rather convex; extremities narrowly rounded; beaks central, somewhat elevated; umbonal region gibbous; muscular impressions comparatively large, distinct, but not deep; border

smooth; teeth of the hinge numerous, short, obtuse, closely interlocking. Length .64 inch; breadth .21 inch; height .25 inch.

Even casts of this species may always be known from the last, by the central position of the beaks and more narrowly rounded extremities.

Locality and position. Same as last.

NUCULA SUBPLANA. Shell small, oval, compressed; anterior end obliquely subtruncate from the beaks a little more than half way down; posterior end round, base broadly rounded; beaks prominent, compressed, located about half way between the centre and the anterior end; surface (of cast) having a few faint indications of concentric undulations; teeth of hinge moderately long; border smooth. Length .25 inch; breadth .09 inch; height .20 inch.

Of this little *Nucula* we have only seen casts. It may be known from other species from these formations by its short compressed form and elevated beaks. It is rare.

Locality and position. Yellow-stone River, one hundred and fifty miles above mouth, in a bed supposed to be upper part of No. 4 of series.

NUCULA CANCELLATA. Shell rather large and thick, ovate or subtriangular, ventricose, pearly within; anterior end short, obliquely truncate, posterior end longer, narrowly rounded; umbonal region gibbous; beaks somewhat elevated, slightly incurved; escutcheon lanceolate; lunule ovate, flattened, but scarcely impressed; surface ornamented by numerous flatly rounded, simple, closely arranged, radiating costæ, which are crossed by small, irregular, concentric wrinkles, and finer indistinct lines of growth; border neatly erenulated. Length .93 inch; breadth .50 inch; height .65 inch.

This beautiful *Nucula* resembles in its surface markings *N. pectenata* of Sowerby, (Min. Conch. vol. 2, page 209, fig. 6, 7,) but differs in the form and depth of its lunule, which is rather narrow ovate and very shallow, while in Sowerby's species it is distinctly cordate and deeply impressed. The muscular impressions, though large, are much more shallow than in *N. pectenata*. The radiating costæ of our species become obsolete on the lunule and escutcheon, and are about five times as broad as the grooves between, near the border. The anterior muscular impression is bordered by a distinct ridge, which extends nearly up to the beaks.

Locality and position. Moreau River, No. 5 of the series.

NUCULA PLANOMARGINATA. Shell ovate, somewhat compressed, pearly within; anterior end very short, obliquely truncate; posterior end long and narrowly rounded, dorsal and ventral margins forming, from the beaks backwards, elliptical curves; beaks much elevated; surface unknown; muscular impressions faint; border smooth. Length .95 inch; height .60 inch; breadth .26 inch.

We have only seen internal casts of this species, the shell being always left adhering to the matrix, from which we infer the surface was ornately marked. It may be at once distinguished from the last by its more compressed form and smooth border.

Locality and position. Same as last.

PECTUNCULINA PARVULA. Shell very small, obliquely oval, somewhat compressed, inequilateral; buccal end and base rounded; anal extremity rounded and slightly extended obliquely downwards; cardinal border short, and having a narrow, well defined, longitudinally striate area on each valve; beaks small, not much elevated, about midway between the centre and the anterior end; surface polished and marked with lines of growth, sometimes crossed by faint indications of radiating costæ; hinge having in each valve three or four teeth on each side of the central triangular ligamentary pit; interior marked with faint radiating grooves terminating in distinct crenulations at the border. Length .18 inch; breadth .10 inch; height .16 inch.

This little shell might, upon a hasty examination, be mistaken for *Cardium rarum*, (Evans and Shumard's unpublished MS.), but it possesses all the characters of the above genus. The shell is often so translucent that the internal radiating grooves are seen through it.

Locality and position. Yellow-stone River, No. 5 of the series.

ARCA (CUCULLÆA) CORDATA. Shell thick and strong, subovate, somewhat triangular or cordiform, very ventricose, abruptly rounded before, obliquely subtruncate behind, and forming a broad curve below; umbones gibbous, much elevated, incurved, located near the anterior end; ligamentary area very short, deeply excavated, grooved and finely striated longitudinally; surface marked with strong imbricating lines of growth and indistinct radiating costæ. Length 2.03 inches; breadth 1.77 inches; height 1.96 inches. Length of ligamentary area 1.25 inches; breadth of do. .30 inches.

This species, in its thickness and general appearance, approaches *Cucullæa Nebrascensis*, (Owen,) but may be distinguished by its shorter buccal extremity, more elevated, approximate and incurved beaks, and especially by its much shorter and narrower ligamentary area. There is in our specimen a distinct sulcus starting from before the beak of each valve, and extending obliquely downwards to a point a little behind the middle of the shell, where it dies out before reaching the border. When viewed on either end, this shell presents a beautiful cordate form.

Locality and position. Moreau Trading Post, No. 5 of series.

ARCA (CUCULLÆA) SHUMARDI. Shell oval, ovate, somewhat globose, rather thin, obliquely subtruncate behind, rounded before, and forming an elliptic curve below; umbones very gibbous, oblique, moderately elevated, incurved, and located a little in advance of the centre; surface ornamented by distinct lines of growth, crossed by numerous, rather indistinct radiating costæ; ligamentary area straight, narrow, moderately excavated, grooved and striated longitudinally; hinge having in each valve three or four transversely striated, oblique, lateral teeth on each side, and small, irregular, intermediate transverse ones in the centre; border smooth. Length (specimen about four times the medium size) 1.67 inches; breadth 1.28 inches; height 1.40 inches.

This is one of the most abundant and beautiful bivalves found in the cretaceous rocks of the upper Missouri country. It varies much in form, some of the specimens being more nearly of an ovate form, in consequence of the anal region being extended, and the beaks more oblique, while others are shorter and more rotund. These two forms are quite well enough marked to constitute a specific distinction, if they were not connected by numerous intermediate ones. As these differences are not due to age or size, we are inclined to regard them as sexual. In old shells the radiating costæ are usually obsolete. In some specimens a single raised line may be seen passing from behind the beak of the right valve to the posterior border, following the direction of the raised edge of the posterior muscular impression. This is rarely seen on the left valve. We dedicate the species to Dr. B. F. Shumard, of St. Louis, Missouri.

Locality and position. Same as last.

MYTILUS ATTENUATUS. Shell much elongated, slightly arcuate; extremities compressed and rounded; anterior end narrow; beaks nearly terminal; surface (of cast) faintly marked with lines of growth. Length 1.90 inches; breadth .50 inch; height .56 inch.

From *M. Galpinianus* and *M. Meekii*, (Evans and Shumard,) this species may be known by its much greater proportional length and less gibbous beaks. Having only seen casts, we know nothing of its surface markings.

Locality and position. Same as last.

AVICULA ? FIBROSA. Shell ovate, subtriangular, very oblique, pointed at the beaks, somewhat rounded below; beaks small, acute, placed at the anterior extremity, and scarcely rising above the hinge; right and left valves alike, convexly arched from the beaks to the base; posterior wing somewhat flattened and apparently broadly rounded; surface ornamented by strong, rounded, radiating plications, which bifurcate very irregularly, and are crossed by strong concentric undulations, so as to give the surface, which is otherwise smooth, a subnodose appearance. Some of our specimens must have been as much as two inches in length when perfect.

It is with much doubt we place this shell in the above genus, as we have in none of our specimens seen any indications of an anterior wing. It is also worthy of note, that the substance of the shell is composed of an internal lamellar, and an external fibrous portion, like *Pinna*, from which, however, it differs in having a posterior wing-like expansion. The radiating costæ are faint or wanting on the wing.

Locality and position. Forks of Cheyenne River, No. 4 of series.

INOCERAMUS VENTRICOSUS. Shell ovate, oval or oblong, extremely inflated, very thin and fragile, structure entirely fibrous; cardinal border straight; anterior end rounded, posterior end apparently subtruncate, base broadly curved; umbonal region remarkably gibbous; beaks oblique, located at the anterior extremity; surface marked with fine regular imbricating lines of growth, and occasionally with a few faint irregular concentric undulations. Length about 4.30 inches; breadth (of right valve) 1.70 inches; height 2.75 inches. Thickness of thickest part of shell, near the hinge, .12 inch; do. of thinnest part near border .03 of an inch.

The most striking characteristics of this species are its remarkably ventricose form, extreme thinness and entirely fibrous structure, there being no internal lamellar portion, as is generally the case in this genus. In our specimens the calcareous matter has been replaced by ferruginous and silicious matter, so as to preserve the original structure of the shell perfectly. If the left valve is as gibbous as the right, the transverse diameter of the shell must be considerably greater than its height. The beak of one of our specimens appears to have been truncated. We have only seen right valves.

Locality and position. Mouth of Judith River, in sandstone, supposed to be the same as No. 1 of the series.

PECTEN NEBRASCENSIS. Superior valve suborbicular, moderately compressed, ornamented by twelve to fifteen strongly elevated costæ about equal to the spaces between; surface marked with very fine, closely arranged concentric lines, crossed by equally fine crowded radiating striæ; buccal ear (imperfect in our specimens) apparently triangular, rather distinctly marked with radiating costæ, crossed by concentric striæ stronger than on the body of the valve; annal ear smaller, triangular, concave on the margin, and marked with distinct concentric lines. Length and breadth .49 inch.

From *P. venustus* of Dr. Morton, (Synopsis, pl. 5, fig. 5.) to which this species appears to be closely allied, it may be distinguished by the fine radiating striæ. In some of the specimens the costæ occasionally bifurcate, while the radiating striæ never run exactly parallel to the costæ, but pass very obliquely along their sides. These striæ are so fine as to be invisible without the aid of a lens. We have not seen the inferior valve.

Locality and position. Yellow-stone River, one hundred and fifty miles from its mouth, in a bed supposed to represent No. 5 of the series.

NATICA SUBCRASSA. Shell obliquely oval or oblong, thick; spire rather short; volutions three to three and a half, convex; suture distinct or somewhat grooved; surface marked with strong lines of growth, which rise, on the body whorl, into distinct imbricating wrinkles; outer lip bevelled; inner lip rather thick, and nearly covering the small umbilicus; aperture ovate, oval, or elliptical, nearly as obtusely rounded above as below. Length .95 inch; breadth .87 inch; apical angle about 93°.

It is possible there may have been other surface markings than those mentioned above, as all our specimens are so worn that fine lines would have been obliterated, had they existed. The species may be known from those found in the higher members of the series in this region, by its stronger lines of growth, and greater thickness.

Locality and position. Mouth of Judith River, from a sandstone supposed to be the same as No. 1 of the series, where it is associated with *Tellina gracilis*, and *T. equilateralis*.

Notices of Remains of Extinct Mammalia, discovered by Dr. F. V. Hayden, in Nebraska Territory.

By JOSEPH LEIDY, M. D.

PACHYDERMATA.

1. *LEPTOCHOERUS SPECTABILIS*, Leidy.

The genus and species are proposed upon a small fragment of the lower jaw of an apparent suilline animal, containing two molar teeth, which appear to be the first and second true molars. The crowns of these teeth have the general form of the corresponding ones of the Peccary, and they are composed of four tubercles or lobes confluent into a thick base, with a ridge anteriorly and posteriorly, and between the outer lobes externally. Of the four lobes that postero-internal is the largest, the external pair are nearly equal, and the antero-internal one is smallest. The inner lobes are trilateral, and the outer ones are much like the corresponding lobes of ruminants. The aims of the crescentoid summits of the outer lobes join the inner lobes; that most anteriorly joining the antero-internal lobe, while the other three join the postero-internal lobe.

Antero-posterior diameter of first true molar	2½ lines.
Transverse, do. do. do.	2 "
Antero-posterior, do. second do.	3 "
Transverse, do. do. do.	2½ "

Discovered in the Mauvaises Terres of Nebraska.

RUMINANTIA.

2. *LEPTAUCHENIA DECORA*, Leidy.

In Dr. Hayden's collection there are several specimens from the valley of White River, Nebraska, consisting of fragments of upper and lower jaws with teeth, which belonged to a ruminating animal allied to the Camel.

One of the fragments contains the left superior true molars and the last pre-molar. The true molars have their crowns more nearly square than in either the Camel or Lama, and the anterior folds of their outer lobes are produced relatively much more outwardly and forwards than in either of the latter. The surfaces between the folds are concave and directed much more obliquely backward than in the Camel. The last pre-molar is bilobed and holds the same relation of position of its outer face to the true molars as in the Camel.

In several fragments of lower jaws containing the last two true molars, and in another with the anterior two true molars, these teeth have a strong resemblance to the corresponding teeth of the Camel.

Another fragment of a lower jaw discovered by Dr. Hayden, on Bear Creek, Nebraska, appears to belong to the same animal as the former, though this may not be the fact. It contains the alveoli for three incisors, a canine, and three premolars. The incisive alveoli are in close relationship as in the Lama. The canine is separated from the former by a hiatus of less than one line, and it has nearly the form of the corresponding tooth in the Camel. Posterior to the canine and separated from it by a hiatus of less than two lines, there is a portion of the first premolar, which appears to have had nearly the same form as the canine. The succeeding two premolars are separated from the first by a hiatus of a little more than four lines. These are inserted by two fangs, are in close contiguity, and have broad, laterally compressed, pyramidal crowns, bearing considerable resemblance to the premolars of the Musks.

Length of series of upper true molars and last premolar	15½ lines.
Antero-posterior diameter of second true molar	5 do.
Transverse do. do.	5½ do.
Length of series of lower true molars	15½ do.
Antero-posterior diameter of last true molar	7 do.
Depth of lower jaw below do.	11 do.
Depth of lower jaw below second premolar	10 do.
Breadth of crown of third premolar	4½ do.
Breadth of crown of second premolar	4 do.

CETACEA HERBIVORA.

3. ISCHYROTHERIUM ANTIQUUS, Leidy.

This genus and species are proposed upon numerous fragments of bones, consisting of two vertebral bodies, the half of a third specimen, several transverse processes, and portions of ribs, discovered by Dr. Hayden, in an out-lier of a lignite formation, between the Moreau and Grand rivers, Nebraska.

The bones are as dense and heavy as those of *Manatus*, to which the genus appears to be most nearly allied. The vertebral bodies, apparently posterior dorsal, are transversely oval in outline, and are perforated at the sides and lower part by large canals converging towards their centre. The anterior and posterior articular surfaces are slightly depressed, as are also the sides of the body. The upper part of the latter, on each side of the position of the spinal canal, presents a large, rugged concavity, about an inch and a quarter in diameter, apparently for articulating with the transverse processes. These latter are antero-posteriorly flattened, cylindrical and curved. Their vertebral extremity is furnished with a convex rugged surface, corresponding to the concavities on the vertebral bodies, and above this surface is a smooth one forming the side of the vertebral canal, and overhung by an abutment for the articular and spinous processes.

The ribs are cylindroid and tapering towards the broken ends of the specimens, and they are quite as dense in structure as those of *Manatus*.

Length of vertebral bodies	.	.	.	1½ inches.
Transverse diameter of do.	.	.	.	2¾ "
Vertical do.	do.	.	.	2 "

RODENTIA.

4. STENEOFIBER NEBRASCENSIS, Leidy.

This species is established upon several specimens, consisting of a much mutilated skull and several fragments of upper and lower jaws with teeth. The skull appears to have the same form as that of *Stenofiber viciacensis*, but is between a fourth and third less in size. The dental formula is the same as in the latter, that is, in.

$$\frac{1-1}{1-1} \text{ m } \frac{4-4}{4-4} = 20. \text{ The molar teeth resemble those of } S. \text{ viciacensis.}$$

Length of skull of <i>S. nebrascensis</i>	.	.	.	2½ inches.
Length of lower jaw	.	.	.	1¾ "
Length of upper molar series	.	.	.	7 lines.
Length of lower molar series	.	.	.	8 "

From the valley of White River, Nebraska.

5. ISCHYROMYS TYPUS, Leidy.

A new genus and species established upon the greater portion of a skull and two fragments of lower jaws. The cranium bears considerable resemblance of form to that of *Stenofiber*. Formula of dentition as follows:—

$$\frac{1-1}{1-1} \text{ m } \frac{5-5}{4-4} = 22. \text{ The molars have cuboidal crowns and are inserted by distinct fangs. The upper ones bear some resemblance to those of } Arotomys; \text{ but the lower ones are more like those above.}$$

Estimated length of skull	.	.	.	2½ inches.
Length of upper molar series	.	.	.	7½ lines.
Length of lower molar series	.	.	.	8 "

From the Bad Lands of Nebraska.

6. PALAEOLAGUS HAYDENI, Leidy.

The genus and species are founded upon numerous small fragments of jaws, containing molar teeth, of a rodent allied to the Hares. The formula of the

$$\frac{6-6}{5-5} \text{ molar dentition is the same as in the latter, } \frac{6-6}{5-5}. \text{ The molars are con-}$$

structed like those of the Hares. The first inferior molar is bi-lobed and not tri-lobed as in the latter. The number of incisors cannot be ascertained in the specimens. Those inferior have much longer roots than in the Hares, as they extend back beneath the molar teeth.

Length of superior molar series $4\frac{3}{4}$ lines, 6 lines, 7 lines.

Length of inferior molar series 5 lines, 8 lines.

Found in the Mauvaises Terres of Nebraska.

7. EUMYS ELEGANS, Leidy.

The genus and species are founded upon a fragment of the lower jaw, containing the middle molar, and the fangs of two others. The estimated size of the skull would be about that of the Rat, (*Mus decumanus*), and the animal also appears to belong to the same family. The molar series of the lower jaw consists of three teeth, and they have exerted crowns inserted by distinct roots.

Length of lower molar series, - - - - $3\frac{3}{4}$ lines.

Depth of lower jaw below middle molar, - - - $2\frac{3}{4}$ lines.

Discovered in the Mauvaises Terres of Nebraska.

CARNIVORA.

8. AMPHICYON ? GRACILIS, Leidy.

A small species of this genus is probably indicated by a specimen in Dr. Hayden's collection, consisting of a fragment of the lower jaw containing two teeth, of which one corresponds in form with the antepenultimate molar of *Amphicyon major* DeBl. or of *A. vetus* Leidy, and the other, being the tooth in advance, has nearly the same form as the corresponding tooth in the wolf. The length of the crown of the antepenultimate tooth is $2\frac{3}{4}$ lines, its breadth $4\frac{1}{4}$ lines; and the depth of the lower jaw is 5 lines.

The specimen was discovered by Dr. Hayden, in association with remains of *Anchitherium*, *Hyopotamus*, *Hyaenodon*, etc. in Nebraska.

Notice of the remains of a species of Seal, from the Post-pliocene deposit of the Ottawa River.

By JOSEPH LEIDY, M. D.

E. Billings, Esq., of Ottawa, West Canada, recently sent to the Academy, for the inspection of its members and for description, a specimen consisting of a slab or portion of a concretion of indurated clay, containing some imbedded bones, which Mr. B. observes, in a letter accompanying the specimen, "appear to him to be those of the extremities of a small animal of aquatic habit." Mr. B. further states, "the specimen was discovered by Mr. Peter McArthur, in a bed of blue clay containing boulders and marine shells and fishes. The locality is in the township of Gloucester, county of Carleton, Canada West, about nine miles east of the city of Ottawa. From this city the river Ottawa runs easterly for about sixty miles, in a channel excavated through a bed of the glacial drift, composed in some places of clay, and in others of sand, gravel and boulders. Where the specimen was discovered, the bank of the river is of clay about thirty feet high, at the time of low water. The water washes out of the bank numerous nodules of the clay, which are consolidated into a pretty hard kind of stone. Many of these nodules, when split open, are found to contain shells, or the skeletons of fishes, often beautifully preserved. The species of shells found up to the present time are *Tellina groenlandica*, *Mytilus edulis*, *Saxicava rugosa*, and a small rostrated one like a *Leda*; and of fishes two species, *Mollotus villosus* and *Cyclopterus lumpus*. They also contain leaves of trees, broken twigs and grass, showing that there was land at no great distance. There is a ridge of low metamorphic hills on the north shore of the river, extending for a great distance parallel with and near the stream. On the south side the country is level, and underlaid with lower Silurian rocks, Utica slate, Trenton, Black River, Bird's-eye and Chazy limestones, with here and there a strip of the lower rocks brought up to the



surface by undulations. I think there was an ancient valley excavated in these rocks before the period of the drift, that it was filled up during that period, and that the river is now cleaning it out again."

The bones referred to prove, on examination, to be those of the greater portion of the hinder extremities of a young seal, but whether of a species distinct from those now found living in the neighboring seas, is a question only to be determined by careful comparison with the corresponding parts of the recent animals. The soft distal extremities of the tibia and fibula are crushed together. The bones of the ankle and foot are well preserved, but the epiphyses of the latter are separated and only partially developed. The matrix in the vicinity of the bones, is marked by the impressions of the hairs and skin which enveloped them.

Mr. Logan, in a report on the "Geological Survey of Canada," (1850, '51, p. 8,) refers the deposit, in which the above described specimen was found, and similar deposits of the St. Lawrence and its tributaries, to the post-tertiary period; and he further observes, that in these deposits, "the remains of whales, seals, and two species of fishes, and many marine shells of those species still inhabiting the Gulf of St. Lawrence, are found;" from which remarks, together with those of Mr. Billings, and the appearance of the fossil itself, we are inclined to suspect the seal of the Ottawa has its descendants yet sporting on the sea border of the Canadas.

Independent of all other considerations, the specimen is interesting, as exhibiting the same process at the present geological period, which for so many successive ages has preserved the remains of vegetables and animals, which are now examined by the palæontologist as so many iconographic illustrations of life in the history of our planet.

Plate III. Representation, two-thirds the size of nature, of the greater portion of the bones of the hinder extremities of a young seal, partially imbedded in one-half of a concretion of indurated clay, from a post-pliocene deposit of the Ottawa River, Canada.

Notices of several genera of extinct Mammalia, previously less perfectly characterized.

By JOSEPH LEIDY, M. D.

CARNIVORA.

1. DEINICTIS, Leidy.

Skull intermediate in form to that of *Felis* and *Machairodus*. Orbits more open posteriorly than in either of these genera; and the anterior extremity of the lower jaw constructed as in the latter. Formula of dentition as in *Putorius*, viz.

3—3	1—1	2—2	1—1	1—1
in. ———	c. ———	p.m. ———	car. m. ———	tub. m. ——— = 32.
3—3	1—1	3—3	1—1	1—1

Incisors relatively as well developed as in *Felis*, with the lower ones arranged as in *Putorius*. Canines like those of *Machairodus*. First premolars small, those succeeding robust with the upper pair bilobed, and the lower ones trilobed. Carnassial molars like those of *Machairodus primævus*. Lower tubercular molar like that of *Putorius*; the upper one thickest at its outer part.

DEINICTIS FELINA, Leidy. Pr. A. N. S. vii, 127, 156. A unique species, with the skull about the size of that of *Machairodus primævus*, or about a fifth smaller than the Panther, (*Felis concolor*.)

Locality. Mauvaises Terres of Nebraska.

PACHYDERMATA.

2. HYRACODON, Leidy.

Skull without horns; with the cranium surmounted by a long and narrow sagittal crest; orbits better defined from the temporal fossæ than in *Rhinoceros*; nasal bones articulating with the intermaxillaries, and deeply notched at their

free ends. Lower jaw intermediate in form to that of *Rhinoceros* and *Tapirus*. Formula of dentition as in the latter, viz.,

$$\begin{array}{ccccccc} 3-3 & 1-1 & & 4-4 & & 3-3 & \\ \text{in.} & \text{c.} & \text{p.m.} & \text{t. m.} & = & 44. & \\ 3-3 & 1-1 & & 4-4 & & 3-3 & \end{array}$$

The incisors and canines are arranged in semicircles as in *Tapirus*, differ little in size, and have simple conical crowns. The premolars and molars resemble those of *Acerotherium incisivum*.

HYRACODON NEBRASCENSIS, Leidy.

Rhinoceros nebrascensis, Leidy. Pr. A. N. S. v, 121; vii, 157; Owen's Rep. Geol. Surv., Wisc. 556; Anc. Faun. Nebr. 86.

Acerotherium nebrascense, Leidy. Pr. A. N. S. v, 331.

A unique species, possessing a greater number of teeth than any other known member of the *Rhinoceros* family. It was about the size of the common hog.

Locality. Mauvaises Terres of Nebraska.

3. TITANOTHERIUM, Leidy.

Formula of dentition as follows:

$$\begin{array}{ccccccc} 2-2 & 1-1 & & 4-4 & & 3-3 & \\ \text{in.} & \text{c.} & \text{p.m.} & \text{t. m.} & = & & \\ ?-? & 1-1 & & 4-4 & & 3-3 & \end{array}$$

The molars are separated from the canines by wide intervals. The latter teeth have short, robust, conoidal crowns. Outer lobes of the premolars like those of *Rhinoceros*, the inner ones isolated from the former and connate. Outer lobes of the true molars like those of *Palæotherium*; the inner ones three in number, of which the intermediate one is conical and is the largest, and the others are trihedral, as in *Chalicotherium*.

TITANOTHERIUM PROUTH, Leidy. Auc. Faun. Nebr. 72; Pr. A. N. S. vii, 157.

Palæotherium, Cuv. Prout. Am. Jour. Sci. Arts iii, 248.

Palæotherium? Proutii, Owen, Norwood, and Evans. Pr. A. N. S. v, 66; Leidy, Ibidem 122; Owen's Rep. Geol. Surv. Wisc. 551.

Rhinoceros? americanus, Leidy. Pr. A. N. S. vi, 2.

Eotherium americanum, Leidy. Pr. A. N. S. vi, 392.

Palæotherium giganteum, Leidy. Anc. Faun. Nebr. 78.

A unique species, and one of the largest of pachyderms. Length of the upper dental series in a straight line 17 inches; transverse diameter of second true molar $3\frac{1}{2}$ inches, antero-posterior diameter the same.

Locality. Mauvaises Terres of Nebraska.

Description of Twenty-five New Species of Exotic UNIONES.

By ISAAC LEA.

UNIO HAINESIANUS. Testâ alată, lævi, subrotundatâ, subinflată, valdè inæquilaterali, valvulis crassis; natibus prominentibus, angulatis; epidermide luteo-fuscâ; dentibus cardinalibus crassis, crenulatis elevatisque; lateralibus longis, crassis subcurvisque; margaritâ albâ et iridescente.

Hab. Siam. S. R. House, M. D.

UNIO MYERSIANUS. Testâ bialatâ, lævi, triangulari, subcompressâ, inæquilaterali, posticè angulatâ; valvulis crassis; natibus prominulis epidermide tenebroso-fuscâ; dentibus cardinalibus longis crenulatisque; lateralibus prælongis, lamellatis subcurvisque; margaritâ colore salmonis tinctâ.

Hab. Siam. S. R. House, M. D.

UNIO HOUSEI. Testâ bialatâ, lævi, triangulari, compressâ, valdè inæquilaterali, posticè obtusè angulatâ, valvulis subcrassis; natibus prominulis; epidermide fuscâ; dentibus cardinalibus lamellatis; lateralibus prælongis, lamellatis subcurvisque; margaritâ colore salmonis tinctâ.

Hab. Siam. S. R. House, M. D.

UNIO GRAVIDUS. Testâ alatâ, lævi, triangulari, valdè inflatâ, valdè inæquilaterali; valvulis tenuibus; natibus elevatis, tumidis; epidermide luteâ, nitidâ; dentibus cardinalibus prælongis, valdè lamellatis; lateralibus longis, lamellatis subcurvisque; margaritâ cæruleo-albâ et iridescente.

Hab. Siam. S. R. House, M. D.

UNIO INORNATUS. Testâ lævi, ellipticâ, inflatâ, subæquilaterali, posticè subangulatâ; valvulis sub-pellucidis tenuibusque; natibus subprominentibus; epidermide olivaceâ, substriatâ; dentibus cardinalibus longis lamellatisque lateralibus longis rectis, lamellatisque; margaritâ cæruleo-albâ et iridescente.

Hab. Siam. S. R. House, M. D.

UNIO LUTENS. Testâ lævi, ellipticâ, inflatâ, subæquilaterali, posticè obtusè angulatâ; valvulis crassis; natibus subprominentibus; epidermide luteâ, politâ; dentibus cardinalibus crassis brevisque; lateralibus brevis, subcrassis subrectisque; margaritâ albâ et iridescente.

Hab. Newville Burmah. Mrs. Vinton.

UNIO EXIMIUS. Testâ alatâ, plicatâ, obovatâ, compressâ, valdè inæquilaterali, posticè rotundatâ; valvulis tenuissimis; natibus prominulis; epidermide virido-luteâ, obsoletè radiatâ; dentibus cardinalibus lamellatis tenuisque; lateralibus longis, lamellatis subcurvisque; margaritâ cæruleo-albâ et iridescente.

Hab. Siam. S. R. House, M. D.

UNIO TUMIDULUS. Testâ lævi, obliquâ, inflatâ, posticè angulatâ, valdè inæquilaterali; valvulis subcrassis; natibus prominentibus; epidermide tenebroso-olivaceâ, striatâ; dentibus cardinalibus longis lamellatisque; lateralibus prælongis subcurvisque; margaritâ albâ et iridescente.

Hab. Siam. S. R. House, M. D.

UNIO RUSTICUS. Testâ tuberculatâ, ellipticâ, inflatâ, inæquilaterali, posticè subangulatâ; valvulis subcrassis; natibus subprominentibus; epidermide olivaceâ, substriatâ; dentibus cardinalibus longis lamellatisque; lateralibus longis, lamellatis subrectisque; margaritâ albâ et iridescente.

Hab. Siam. S. R. House, M. D.

UNIO SAGITTARIUS. Testâ lævi, valdè transversâ, valdè inæquilaterali, subinflatâ, subcylindraceâ, posticè acuto-angulatâ; valvulis subtenuibus; natibus vix prominentibus; epidermide virido-olivaceâ, striatâ; dentibus cardinalibus longis, rectis lamellatisque; lateralibus prælongis subrectisque; margaritâ albâ et iridescente.

Hab. Siam. S. R. House, M. D.

UNIO SUBSTRIATUS. Testâ lævi, ellipticâ, subinflatâ, subæquilaterali; posticè angulatâ, anticè rotundatâ; valvulis crassiusculis; natibus subprominentibus granulatisque; epidermide olivaceâ eradiatâ et rugoso-striatâ; dentibus cardinalibus longis, rectis lamellatisque; lateralibus longis, rectis lamellatisque; margaritâ argenteâ et iridescente.

Hab. Siam. S. R. House, M. D.

UNIO SCOBINATUS. Testâ plicatâ, transversâ, in medio compressâ, valdè inæquilaterali, posticè angulatâ, ad basim emarginatâ; valvulis subcrassis; natibus parvis, prominulis, ad apicem undulatis; epidermide viridi et luteâ, minutè striatâ; dentibus cardinalibus obliquis, compressis; lateralibus prælongis, in uterque valvis duplicis subrectisque; margaritâ albâ et iridescente.

Hab. Siam. T. R. Ingalls, M. D., S. R. House, M. D.

UNIO HUMILIS. Testâ plicatâ, transversâ, subinflatâ, subæquilaterali, subcylindraceâ, posticè biangulatâ; valvulis tenuibus, pellucidis; natibus prominulis, perplicatis; epidermide virido-luteâ, striatâ; dentibus cardinalibus lamellatis rectisque; lateralibus longis lamellatisque; margaritâ cæruleo-albâ et iridescente.

Hab. Siam. S. R. House, M. D.

UNIO PHASELUS. Testâ plicatâ, transversâ, inflatâ, subemarginatâ, valdè inæquilaterali, posticè obtusè angulatâ; valvulis crassis; natibus parvis, prominulis, ad apicem undulatis; epidermide viridi et luteâ, politâ; dentibus cardinalibus brevis subcrassisque; lateralibus prelongis, duplicis in uterque valvis subcurvisque; margaritâ albâ et iridescente.

Hab. Siam. S. R. House, M. D.

UNIO VERREAUIANUS. Testâ sulcatâ, oblongâ, inflatâ, subemarginatâ, subæquilaterali, posticè obtusè angulatâ; valvulis crassis; natibus parvis, subprominentibus undulatisque; epidermide luteo-brunâ, striatâ dentibus cardinalibus magnis, obliquis, compressis crenulatisque; lateralibus longis, rectis lamellatisque; margaritâ salmonis colore tinctâ et iridescente.

Hab. Cape of Good Hope. Mr. E. Verreau.

UNIO AFRICANUS. Testâ lævi, ellipticâ, subcompressâ, subemarginatâ, valdè inæquilaterali, posticè obtusè angulatâ; valvulis subtenuibus; natibus parvis, prominulis undulatisque; epidermide luteo-olivaceâ et politâ; dentibus cardinalibus parvis, obliquis, compressis sublamellatisque; lateralibus prælongis subrectisque; margaritâ salmonis colore tinctâ et valdè iridescente.

Hab. Cape of Good Hope. Mr. E. Verreau.

UNIO SHURTLEFFIANUS. Testâ minutè plicatâ, ellipticâ, inæquilaterali, subcylindraceâ, posticè obtusè angulatâ, anticè rotundatâ; ad latus subplanulatâ; valvulis subcrassis; natibus prominulis, ad apices minutè undulatis; epidermide virido-luteâ; dentibus cardinalibus sublongis, compressis geminisque; lateralibus longis subrectisque; margaritâ salmonis colore tinctâ et iridescente.

Hab. Sina River, India, Major Le Conte. Ahmednugger, India. S. Shurtleff, M. D.

UNIO EFFULGENS. Testâ sulcatâ, ellipticâ, subinflatâ, inæquilaterali, posticè obtusè angulatâ; valvulis subcrassis; natibus prominulis; epidermide tenebrososuscâ, politâ; dentibus cardinalibus parvis crenulatisque; lateralibus longis curvisque; margaritâ cæruleo-albâ.

Hab. Brazil. B. W. Budd, M. D.

UNIO DUNKERIANUS. Testâ plicatâ, transversâ, subinflatâ, valdè inæquilaterali, posticè obtusè angulatâ; valvulis subtenuibus; natibus prominulis, costis divaricatis; epidermide tenebroso-fuscâ politâque; dentibus cardinalibus longis compressisque; lateralibus prælongis, lamellatis rectisque; margaritâ cæruleo-albâ et valdè iridescente.

Hab. River Macacoú, Rio de Janeiro, Brazil, Prof. Dunker. New Grenada, Mr. E. Verreau.

UNIO SHUTTLEWORTHII. Testâ sulcatâ, oblongâ, transversâ, valdè inæquilaterali, subcompressâ, posticè obtusè biangulatâ, ad latus planulatâ; valvulis subcrassis; natibus prominulis; epidermide bruno-nigricante; dentibus cardinalibus parvis; lateralibus longis subcurvisque; margaritâ purpureâ et iridescente.

Hab. Australia. R. J. Shuttleworth, Esq. Berne, Switzerland.

UNIO NUCLEUS. Testâ plicatâ, quadratâ, inflatâ, subæquilaterali, posticè angulatâ; valvulis crassis; natibus prominentibus, perplicatis; epidermide virido-fuscâ, minutissimè perstriatâ; dentibus cardinalibus crassis brevisque; lateralibus crassis, brevis, duplicis in uterque valvis subcurvisque; margaritâ cæruleo-albâ et iridescente.

Hab. Siam. S. R. House, M. D.

UNIO WHEATLEYANUS. Testâ lævi, ellipticâ, inflatâ, inæquilaterali; valvulis crassis; natibus prominulis, costis elevatis, epidermide tenebroso-olivâ, rugoso-striatâ; dentibus cardinalibus magnis, crassiusculis, subdivisis; lateralibus longis crassisque; margaritâ vel albâ vel carneâ et iridescente.

Hab. Rio Plata, M. A. D'Orbigny. Rio Negro. C. M. Wheatley, Esq.

UNIO BROWNI. Testâ lævi, obovatâ, valdè compressâ, valde inæquilaterali; valvulis subcrassis; natibus prominulis, costis divaricatis; epidermide tenebrosoviridi, striatâ; dentibus cardinalibus submagnis, in utraque valvis duplicis; lateralibus lamellatis, sublongis curvisque; margaritâ albâ.

Hab. Mocha? Asia. Capt. George Brown.

UNIO SUAVIDICUS. Testâ lævi, oblongâ, subcompressâ, valdè inæquilaterali, anticè rotundatâ, posticè truncatâ, natibus subprominentibus, costis elevatis; epidermide luteo-olivâ, minutè striatâ; dentibus cardinalibus parvis, compressis, crenulatis, in utraque valvis duplicis, lateralibus longis, lamellatis subrectisque; margaritâ cæruleo-albâ et iridescente.

Hab. River Amazon. Mr. E. Verreau, Paris.

UNIO UMBROSUS. Testâ lævi, ellipticâ, subinflatâ, inæquilaterali; valvulis subcrassis; natibus prominulis; epidermide castaneâ, politâ, transversè fasciatâ; dentibus cardinalibus magnis, subelevatis; lateralibus longis, lamellatis subcurvisque; margaritâ vel purpureâ vel roseâ et iridescente.

Hab. Medellin River, Mexico. M. Burrough, M. D.

Description of a new Snake from Illinois.

By ROBERT KENNICOTT.

REGINA KIRTLANDII.

The body of this species is somewhat trigonal in cross sections, (flattened on the abdomen,) and tapers gently from the middle to either extremity. There is no distinction of neck, and the very small head calls to mind that of the *Coluber amoenus* of Say. It is, however, much larger, and the scales are very strongly carinated. The carinæ are found on all the longitudinal rows of scales, of which there are nineteen exclusive of the belly scales; the external row is almost as sharply keeled as those on the back, even to the tip of the tail. The dorsal scales are narrow and elongated, the sides nearly parallel except near the ends.

As already stated, the head is very small. The vertical plate is sub-hexagonal, the two anterior sides forming a very obtuse angle; the external edges are slightly convergent posteriorly. The nostrils in the middle of the two plates. There is one ante-orbital and two post-orbitals; there are six labials above and seven below, in addition to the rostrals.

The ground color of this snake is a light purplish brown, with four rows of large nearly circular blotches covering the whole back and sides. They are arranged so as to alternate; the outer blotches on the outer row are a little larger than those on the two central ones, and are of the width of four or five scales. The belly is of a pale brick red, (fading to brownish yellow in alcohol,) with a well defined blotch of black near the exterior of each scale. These give rise to a series of very well defined round black spots on either side of the abdomen; and there is also an obscure series of dark blotches on the anterior edge of the scales in the exterior dorsal row. The dots in this series are separated by intervals of two unmarked scales. The spots of this row alternate with those of the larger series immediately above.

On separating the scales, the skin is seen to be colored like the adjacent scales. It is black in the dark blotches and very light in the intermediate space, giving rise to the appearance of whitish edges to the scales.

There are thus four series of large spots on the back and sides, two on the belly, and two in the exterior dorsal rows, making eight in all. The last mentioned row is sometimes very obscure, the others are always distinct.

I refer this serpent to the genus *Regina* of B. and G., although it is different in some respects from the other known species. It is somewhat like the *R. rigida*, but is differently marked; the latter having the two abdominal rows close together on the middle of the belly, instead of being separated. Neither is there

any indication in *R. rigida* of the four series of dorsal blotches. In fact, there is no North American species more strongly marked than this.

Abdominal scales 133, the last one divided; subcaudal 59. Dorsal rows of scales 19. Length $19\frac{1}{2}$ inches, of which the tail measures $4\frac{1}{2}$ inches.

As yet, this species has only been detected in Northern Illinois, where it is rarely met with. The few specimens obtained have been found in the woods, generally under logs.

This snake is rather sluggish, and, like *Regina Grahamii* of B. and G., is not very pugnacious.

In giving to this serpent the name of Dr. Kirtland, as a slight token of the respect due him, to whose enthusiastic and untiring devotion to Science the West owes so much, I would also make some expression of my personal gratitude to the honored teacher, whose kind encouragement and instruction led me to study Nature, by dedicating to him his pupil's first contribution to Science.

Description of several new genera and species of Fossil Fishes, from the Carboniferous Strata of Ohio.

By J. S. NEWBERRY, M. D.

MECOLEPIS Newberry.

Heterocercal lepidoids of small size. Body fusiform. Head obtuse. Tail elongated. Lobes very unequal. Fins small and provided with delicate fulcra. Dorsal opposite anal or nearly so, both set far back in body. Cranial surface ornamented by corrugations, tubercles or granulations. Opercular, maxillary and hyoid plates ornamented with convoluted corrugations of the surface in various patterns.

Scales smooth, or ornamented; posterior margin of lateral scales all or in part serrated. Scales of median line above and below characteristically angled or crenulated. Two rows of scales on sides extending back to near anal fin, remarkably high, vertical 2 to 5 times longitudinal diameter.

Lateral line nearly straight, passing the upper part of lower row of high scales.

Teeth conical, short, *en brosse*.

The peculiar group of fishes to which I have given the generic name of *Mecolepis*, apparently represents the *Palæonisci* in the ichthyic fauna of the locality where they occur. From *Amblypterus* and *Elonichthys* they may readily be distinguished by their small fins all bearing fulcra. With *Palæoniscus* their affinities are closer, but the *ensemble* of characters presented by the large number of specimens which I have examined, seem to separate them from that genus. Among these diagnostic characters the most conspicuous are their small size, posterior position of dorsal fin and especially the high lateral scales.

1. *M. CORRUGATUS* Newb. Body fusiform, robust. Length 3 in. 4 lines; breadth 10 lines. Length of head 8 lines. Anterior lateral scales $2\frac{1}{2}$ times as high as long. Cranial plates ornamented by convolutions of fine, thread-like corrugations. Maxillary bones, opercular and hyoid plates corrugated much as superior surface of head. Scales smooth, except a few on the anterior dorsal surface, which are finely striate and punctate. Posterior margins of lateral scales as far back as anal and dorsal fins serrated. Scales of tail, like most of those of the dorsal and ventral surfaces, plain on surface and margins. Anterior margin of anal fin opposite centre of dorsal fin; longest rays of anal fin when collapsed just reaching base of caudal fin.

2. *M. TUBERCULATUS* Newb. Body fusiform. Entire length 3 inches. Head 6 lines. Tail 8 lines.

Cranial plates strongly tuberculated; tubercles rounded elongated and reniform. Surfaces of opercular, maxillary and hyoid bones covered with linear parallel corrugations.

Surface of all the scales of the body smooth, except a few on the anterior

dorsal and ventral surfaces, which are sometimes finely punctate. Lateral scales nearly 5 times as high as long. Posterior margins of lateral scales bearing a few serrations.

Anal fin opposite dorsal.

Radial formula,

D. 5; C. 14; A. 8?; V. 6; P. ?

3. *M. GRANULATUS* Newb. Body fusiform, robust. Length 3 inches, breadth 7 lines. Head 6 lines long. Tail 9 lines.

Head tubercled above, tubercles elongated, with granulations between. Opercula, maxillaries and hyoid plates threaded.

Scales apparently thinner and more delicate than those of any other species. Those on anterior portion of body granulated, and having a faint double waved line along anterior margin. Posterior border serrated.

Lateral scales 4 times as high as long.

Radial formula,

D. 6; C. 14; A. 8; V. 5?; P. 9?

4. *M. LINEATUS* Newb. Body fusiform, robust. Length 3 inches; breadth 8 lines.

Cephalic bones all ornamented with thread-like lines, as in *M. corrugatus*, and without tubercles.

Scales of anterior portion of abdomen covered with concentric thread-lines. Margins of lateral scales ornamented in the same manner.

Lateral scales lower than in any other species yet discovered, greatest vertical diameter only twice longitudinal.

Scales of abdomen twice as long as broad.

5. *M. OVOIDEUS* Newb. Fish small, robust. Body ovoid. Length 1 inch 6 lines; breadth 6 lines. Length of head $4\frac{1}{2}$ lines.

Cranial surface corrugated and finely granulated; opercula and lower parts of head ornamented by thread-like corrugations.

Scales of anterior portion of abdomen granulated, of sides serrated.

Lateral scales $3\frac{1}{2}$ times as high as long.

6. *M. ORNATISSIMUS* Newb. Fish small, fusiform, slender. Length 2 inches; breadth 5 lines.

Cranial surface sparsely tubercled, tubercles somewhat radiated. Spaces between tubercles finely granulated. Opercula, maxillaries and hyoid bones granulated and corrugated. All the scales of the body and tail ornamented with granulations, striæ or denticles.

Lateral scales 4 times as high as long, with a double line of appressed denticles on anterior border, and acute serrations of posterior margin.

Fins all relatively longer than in other species. Dorsal fin nearly opposite anal.

7. *M. INSCULPTUS* Newb. Body fusiform, slender. Length 2 in. 6 lines, breadth 5 lines.

Cranial plates ornamented with elongated tubercles, spaces between tubercles granulated. Sides and under surface of head marked by raised lines and fine granulations.

Scales on anterior half of body highly ornamented. Lateral scales $3\frac{1}{2}$ times as high as long, and having a doubled wave line along anterior margin, with acicular denticulations of posterior border.

Scales of abdomen having entire surface covered with appressed denticles. Scales of tail and posterior portion of body plain.

Dorsal fin opposite anal.

8. *M. SERRATUS* Newb. Small, robust. Length 1 in. 6 lines. Head 4 lines. Tail 5 lines. Breadth of body 5 lines.

Head finely tubercled above. Opercula, maxillaries and hyoid plates marked by fine linear corrugations.

Highest scales of sides 3 times as high as long. All lateral scales quite into the tail, strongly and sharply serrate on posterior margin. Surface of anterior scales wrinkled from the serrations forward.

Anterior margin of anal fin opposite posterior margin of dorsal.

ELONICHTHYS Giebel.

E. PELTIGERUS, Newb. Body short, compressed. Length 5 inches. Height 1 in. 6 lines. Breadth 1 inch. Cephalic bones all ornamented by parallel convolutions of thread lines. Scales all covered by similar raised lines, which cross them diagonally downward and backward, terminating in serrations of the posterior margins.

About the middle of the interval between the occiput and dorsal fin, on the median line, begins a row of oval scales, four times as large as the scales of the sides; ornamented in the same manner, extending in a single row along the median line to the dorsal fin, and behind the dorsal fin to the tail, where they are transformed into the large striated fulcra, which overlie the prolongation of the vertebral to its termination.

These abnormal scales of the dorsal line are a striking peculiarity in the species, and have suggested the name given it.

CELACANTHUS Agass.

1. *C. ROBUSTUS* Newb. Body robust, 1 foot 6 inches in length. Upper surface of cranium covered with small closely approximated tubercles; maxillaries and opercula threaded with fine parallel, sometimes interrupted lines. Margins of opercula in mature specimens wavy.

Scales elliptical, thin, 7 to 9 lines in length, nearly half the surface exposed; exposed portion covered with thread-like lines similar to those of the opercula and maxillaries, and which converge toward the posterior angle of the scale.

C. ORNATUS, Newb. Body fusiform, slender, scarcely wider than head. Size small, not exceeding 4 to 5 inches in length. Upper surface of head ornamented with tubercles, which are much larger and more remote than in preceding species. Opercula and maxillaries threaded, and like the scales having stronger markings than in the larger species.

Radial formula,

A. D. 8; P. D. 5; C. 24?; A. 6; V. ?; P. ?

C. ELEGANS Newb. Body fusiform, robust, 6 to 8 inches in length. Cranial surface covered with closely approximated tubercles. Surface of opercular and maxillary bones threaded. All the ornamenting of head relatively stronger than in *C. robustus*, but less so than in *C. ornatus*. Scales similar in form and markings to those of both these species, but more delicate than either. Anterior dorsal fin slightly in advance of ventrals. Posterior dorsal as much forward of anal fin.

Radial formula. A. D. 7?; P. D. 5; C. 22; A. 6; V. 9?

PYGOPTERUS Agass.

P. SCUTELLATUS Newb. Body fusiform, slender, 15 to 18 inches in length. Head depressed. Snout pointed. Both jaws thickly set with conical, slender, acute, striated teeth of unequal size. Scales very small and thick, higher than long. Head and anterior portion of body covered with articulated plates ornamented with strong, radiating, raised lines. None of my specimens show the form of the caudal fin.

This fish presents such striking differences in its scales and plates from all described species of *Pygopterus*, that I have hesitated about placing it in that genus. It would seem, however, to have much in common with *P. Grecockii* Agass., not yet fully described.

RHIZODUS Owen.

R. LANCIFER Newb. Teeth striated below. Section elliptical, smooth toward the summit, where they are very much compressed, with a lenticular section and cutting edge on both sides. Form of summit of tooth like that of a lance head. Near the apex of the tooth the cutting edge of one side is slightly gibbous, an apparent tendency toward a barbing of the point, as in some species of *Lepidosteus*.

As usually found, the plicated base of the tooth has mostly disappeared, the solid point alone remaining; this is about an inch in length. The entire tooth was more than twice that length.

R. INCURVUS Newb. Head massive. Superficial bones strongly tuberculated. Tubercles elongated, vermicular, sometimes becoming elevated lines of a line in breadth, and having a radiated arrangement. Jaws strong, both thickly set with strong ancipital curved teeth. These teeth are striated below, elliptical in section, and toward the summit curved backward toward the throat. They are of different sizes, as in all allied fishes. The smaller teeth are 6 to 9 lines in length and thickly set; the larger ones are much fewer in number, and more than twice as long. One of the larger teeth is placed near the extremity of the lower dentary bone of each side, as in *R. gracilis* McCoy.

R. ANGUSTUS Newb. Laniary teeth elongated, slender, finely striated at base, smooth above, with cutting edges. Subordinate teeth half the length of the larger ones. Conical, acute, striated at base, with a circular section throughout. Surface of jaw coarsely tubercled.

In this diversity of form in the teeth, this species differs from *R. gracilis* McCoy and from *R. Hibberti* Ag., as well as from the other species I have found in Ohio. In *R. incurvus* N., however, the teeth have a section so nearly circular that there seems no good reason for separating them by generic distinctions.

Of all the species of *Rhizodus*, which I have found, I probably have scales and perhaps vertebræ and cranial plates, but as yet have been unable to find these organs connected with the teeth.

DIPLodus Agass.

D. COMPRESSUS Newb. Teeth of moderate size, base small. Lateral denticles unequally spreading, compressed, with acute points and strongly crenulated edges. Central denticle very small, acute, compressed, finely crenulated on margin.

D. GRACILIS Newb. Tooth as large as *D. gibbosus* Agass. Base very small. Lateral denticles long, curved, slender, divergent towards the points, much less compressed than in preceding species, less acute, and less conspicuously crenulate on margins. Median denticle small, subulate, scarcely crenulate on margins.

D. LATUS Newb. Teeth very large and very robust. Lateral denticles nearly straight, and on the same plane, divergent, $\frac{1}{3}$ to $\frac{1}{2}$ as broad at base as long, compressed. Each margin strongly crenulated. Middle cone obsolete, or reduced to a simple knob. Base of tooth large, under surface flat.

All the specimens of *Diplodus* from Ohio which have come under my observation, numbering some hundreds, have crenulated margins, in that respect presenting a striking difference from the species described by Agassiz.

CLADODUS Agass.

C. ACUMINATUS Newb. Central denticle elongated, conical, acute; lateral denticles very acute, compressed. Base small and thin.

CHIRODUS McCoy.

C. ACUTUS Newb. Teeth as long as *C. pes-ranæ* McCoy, but more slender throughout. Denticles more acute.

CLIMAXODUS McCoy.

C. BREVIS Newb. Teeth oval, in form, shorter than *C. imbricatus* McCoy. Ridges which cross the surface more remote, with sharp crests and sinuous outline.

PLEURACANTHUS Agass.

P. BISERIALIS Newb. Spine straight, strong, tapering rapidly to a moderately acute termination. Length four inches; diameter at base 4 lines. Anterior face rounded; posterior face nearly flat. Entire surface finely striated longitudinally. Sides flattened, joining posterior surface at right angles. At angle on each side a double row of small, closely set, acuminate, depressed hooks. On the upper part of the spine the hooks are arranged in a single row. Side of spine at base of the hooks marked by a distinct longitudinal furrow.

P. ARCUATUS Newb. Spine slightly curved backward, rapidly tapering to an acute point. Anterior surface rounded; posterior face nearly flat. At angle formed by the junction of sides with posterior face is, on each side, a single row of closely set, acuminate, depressed hooks. Anterior surface marked with fine longitudinal striæ.

P. DILATATUS Newb. Spine short, robust, one inch six lines long, straight, acuminate at summit, largest near middle, contracted at base. Anterior face rounded; posterior face flattened, and bearing at the angles on either side a row of minute depressed hooks. Surface smooth.

COMPSACANTHUS Newb.

Spines of small size, very neat in form and finish. Section at all points circular. A single row of relatively large, remote, depressed hooks is set along the posterior median line.

Of this genus I have probably but one species.

C. LÆVIS Newb. Spine slender, curved, acuminate, having a circular section at all points; upper two-thirds furnished with a single row of depressed acuminate hooks remotely set along median line of posterior surface.

On motion of Mr. Cassin, a Committee was appointed to prepare a list of Correspondents for publication. The following compose the Committee: Mr. Cassin, Dr. Le Conte and Dr. Leidy.

ELECTION.

Dr. R. A. Penrose and Mr. Wm. H. Patterson, of Philadelphia, were elected *Members*, and Mr. F. B. Meek, of Albany, was elected a *Correspondent*.